C L A I M S

1. A process for the generation of electricity and the production of a concentrated carbon dioxide stream using a molten carbonate fuel cell, the fuel cell comprising an electrolyte sandwiched between an anode and a cathode, an anode chamber and a cathode chamber, wherein
- a fuel gas is fed to the anode chamber and a cathode inlet gas comprising carbon dioxide and molecular oxygen is fed to the cathode chamber,
- the anode and cathode reactions are allowed to take place to produce electricity, an anode off-gas and a cathode off-gas,
- the anode off-gas is at least partly fed to a catalytic afterburner wherein it is oxidised with an oxidant to obtain an oxidised anode off-gas,
- the remainder of the anode off-gas is recycled to the anode chamber,
characterised in that:
- the oxidant consists of part of the cathode off-gas and/or part of a molecular oxygen containing external oxidant stream, which external oxidant stream comprises at most 20% (v/v) nitrogen;
- the oxidised anode off-gas is brought into heat-exchange contact with the remainder of the cathode off-gas and the remainder of the external oxidant stream to obtain cooled anode off-gas and a heated mixture of cathode off-gas and external oxidant;
- the cathode off-gas is cooled before it is being brought in heat-exchange contact with the oxidised anode off-gas;

- the cooled anode off-gas and the heated mixture of cathode off-gas and external oxidant are fed to the cathode chamber as the cathode inlet gas;
- as soon as a set point in the carbon dioxide concentration at the cathode chamber outlet is reached, part of the cooled anode off-gas is withdrawn from the process.

2. A process according to claim 1, wherein the withdrawn anode off-gas is further cooled to separate water from it and to obtain a concentrated carbon dioxide stream.

3. A process according to claim 1 or 2, wherein the fuel gas is a hydrocarbonaceous gas, and wherein the fuel gas is converted into a carbon monoxide and hydrogen containing gas in the anode chamber.

4. A process according to claim 3, wherein only part of the anode off-gas is fed to the catalytic afterburner and the remainder is recycled to the anode chamber, preferably 35 to 90 % (v/v) of the anode off-gas is recycled to the anode chamber, more preferably 50 to 80 % (v/v).

5. A process according to claim 3 or 4, wherein the fuel gas is natural gas, methane, biogas or land-fill gas.

6. A process according claim 1 or 2, wherein the fuel gas is a reformer effluent comprising hydrogen and carbon monoxide.

7. A process according to any one of the preceding claims, wherein the fuel gas contains at most 25 % (v/v) of nitrogen, preferably at most 15 % (v/v) of nitrogen, more preferably at most 10 % (v/v) of nitrogen, most preferably contains substantially no nitrogen.

8. A process according to any one of the preceding claims, wherein the set point in carbon dioxide concentration at the cathode chamber outlet is in the

range of from 5 to 40% (v/v), preferably of from 10 to 30% (v/v).

9. A process according to any one of the preceding claims, wherein the external oxidant stream comprises at most 10% (v/v) of nitrogen, preferably is substantially pure oxygen.